# Mr. *PRICE*'s

15.T.1.735

# SECOND LETTER

To One of the

*Honourable Commiſſioners*,

Appointed by ACT of PARLIAMENT

# For Building a BRIDGE

Over the *THAMES*, from
*Fulham* to *Putney*.

BIBLIOTH

Together with ſome

# PROPOSALS

FOR BUILDING

# A Wooden Bridge

According to a

DRAUGHT and MODEL

Deliver'd to a

*Committee of the ſaid Commiſſioners.*

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Printed in the Year 1726.

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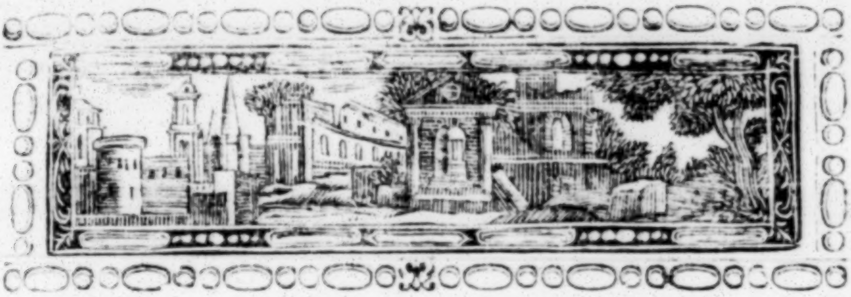

## Mr. *PRICE*'s

# Second LETTER, *&c.*

*SIR*,

HAVING already ſent your Honour ſome Thoughts and Propoſals relating to a Stone Bridge, and underſtanding the Honourable Commiſſioners have come to a Reſolution, That *ſuch a Bridge be built croſs the* Thames *from* Fulham *to* Putney, *as may be ſufficient to ſupply the preſent Exigency, and be uſeful in Building a more Subſtantial Bridge, as there may be Occaſion*; give me Leave, Sir, to lay before you my Sentiments relating to Wooden Bridges, and the Manner I propoſe one, according to a Model, Plan, and Section which I have made for that Purpoſe.

*BRIDGES* being a ſort of Street or continued Way over the Water, (tho' may be reckon'd a principal Part of the Way, by Reaſon of the Depth and Rapidity of Rivers over which they are made,) ought therefore to have the ſame Qualifications that we judge requiſite in all other Fabricks, which are, that they ſhould be Convenient, Beautiful, and Durable.

As a Stone Bridge is intended to be built hereafter from the End of *Putney-ſtreet* to *Fulham*, (which ſhould be directly ſtrait, and croſs the Stream) therefore the Place to be choſen for the preſent Bridge ſhould be where it may not only be the moſt Commodious, but where it may be leaſt affected by, or affect, the Building of the intended Stone Bridge: The farther off, the better, and rather below than above it; for,

1. By placing the Wooden Bridge below the other, it will not be liable to ſuch Eddies and quick Streams (from the Stone Piers ſtanding in the River) at every Flood-Tide, as it would be if it was above it; becauſe the Flood-Tide, which is but four Hours coming in, has much greater Force and Rapidity than the Ebb, which is eight Hours in going out, eſpecially when the Flood-Tide is drove in by high Winds.

2. By placing the Wooden Bridge as far above the intended Stone Bridge as I propoſe it below, is going not only a great way

round, and out of the Way, but encreaſes the Expence by making the Road to it. Therefore the *only Place* to build the preſent Bridge, is, ſtrait over from *Fulham* to the End of *Brewers-Lane* in *Putney*, being Eaſtward of the intended Stone Bridge.

3. If *Brewers-Lane* be not found Commodious enough for the preſent Exigency, a Wharf or Cauſeway may be made along *Putney Shore*, under the Wall of the Church-yard, which would entirely anſwer the Purpoſe, and accommodate the Bridge with two Ways of coming to it, which the Ferry at preſent cannot have at High Water. I would alſo propoſe filling up the Muddy Dock over-againſt the *Swan-Door* at *Fulham*, for the more commodious coming directly on the North End of the ſaid Bridge.

4. Another Conveniency is, *that Place* being the ſtraiter Part of the River, the Bridge will not ſuffer ſuch Inconveniences as would attend it, where the winding and uneven Parts of the Banks are expoſed and liable to be waſh'd away by Land Waters and Floods, which draw into thoſe Turtuoſities all the Matter waſh'd from the Banks, and not being able to remove directly forward, but lodging there, it ſtops other Things, which turning towards the Piles, fills up the Arches, whereby the Work ſuffers in ſuch a manner that it falls in Time to Ruin.

A *Wooden Bridge* to be made over the River of *Thames*, altho' it be intended to ſerve only the preſent Exigency, yet I preſume ſuch a Bridge ſhould be made as ſubſtantial, ſolid, and well join'd together, that no Danger may be apprehended, nor that it be ruinated by Inundations, Floods, or Quantities of Ice, as tho' it was intended to ſtand perpetually; only with this Difference: It may be made, that the Timber, which is not expos'd to the Water or Earth, may be of yellow Firr, inſtead of Oak, which will ſave a great Expence, and carry its own Weight better than Oak, tho' not ſo durable.

*Length.* The ſaid intended Bridge is to extend 852 Feet, including the two Lodges for receiving the Toll, and the Butments or Heads of the Bridge (being the ſame Length as I made the Deſign for the Stone Bridge) which Length is divided by Oaken Piles into 19 Arches or Voids for the Navigation, *viz.* 5 of 45 Feet each; 6 of 40 Feet each; 2 of 35 Feet each; 2 of 30 Feet each; 2 of 25 Feet each; and 2 of 20 Feet wide each: And the remaining 45 Feet is divided for the two Lodges, and Heads of the Bridge.

*Breadth.* The Width of the Bridge is propos'd to be 20 Feet in the Clear between the Rails; which being divided by a Row of Poſts, 4 Feet from the Weſt Side, there will remain Room for 2 Coaches, or Carriages, to paſs each other with Safety to the Foot Paſſengers.

*Height.* The Height of the Bridge is propos'd to be from the Bottom of the River in the Channel, 28 Feet to the under Part. Suppoſing then that at the low Water Mark there be 7 Feet of Water, and the Tide was to flow 11 Feet perpendicular, there will be 10 Feet clear for the Craft to go through at the higeſt Water. The 3 Arches or Voids near each End of the Bridge, riſe not ſo high as the other, but are to riſe gradually, to make the Aſcent and Deſcent very eaſy, which makes it both convenient and commodious, as the prick'd Line in the Draught, mark'd A. deſcribes.

*Piles.* The Piles that ſupport the whole Bridge, I propoſe not to ſet perpendicular, but leaning and inclining to each other on the oppoſite Side, as is to be ſeen by the Model, which are of the ſame ſort of Work as the Bridge which *Julius Cæſar* caus'd to be made over the *Rhine*, that the *Germans* might be ſenſible of the *Roman* Power, as he deſcribes it himſelf in the Fourth Book of his Commentaries; whoſe Words are, *Rationem igitur Pontis hanc inſtituit. Tigna bina ſequipedalia, paululum ab imo præacuta, dimenſa ad altitudinem fluminis, intervallo pedum duorum inter ſe jungebat. Hæc cum machinationibus immiſſa in flumen defixerat, feſtuciſque adegerat; non ſublicæ modo directa ad perpendiculum, ſed* *prona ac faſtigiata, ut ſecundum naturam fluminis procumberent. His item contraria duo, ad eundem modum juncta, intervallo pedum quadragenum, ab inferiore parte contra vim atque impetum fluminis converſa, ſtatuebat. Hæc utraque, in ſuper bipedalibus immiſſis, quantum eorum tignorum junctura trabibus diſtabat, binis utrinque fibulis ab extrema parte diſtenebantur: quibus diſcluſis, atque in contrariam partem revinctis, tanta erat operis firmitudo, atque ea rerum natura, ut quo major vis atquæ ſeſe incitaviſſet, hoc arctius illigata tenerentur. Hæc directa injecta materia contexebantur, ac longuriis cratibuſque conſternebantur; ac nihilſecius, ſublicæ, ad inferiorem partem fluminis oblique adjungebantur, quæ pro ariete ſubjectæ & cum omni opere conjunctæ, vim fluminis exciperent, & aliæ item ſupra pontem mediocri ſpatio, ut ſi arborum trunci ſive naves, dejiciendi operis cauſa, eſſent a barbaris miſſæ, his defenſoribus earum rerum vis minueretur, neu ponti nocerent.*

Doubtleſs it was a moſt admirable and difficult Piece of Work; but tho' various Controverſies have ariſen about it for want of the Force of ſome Terms in his Deſcription, and various Draughts made of it, according to Mens various Ideas; in my Opinion, *Paladio*'s Deſign is the moſt like it, becauſe it not only anſwers *Cæſar*'s Deſcription, but by its ſucceeding to a Wonder, in a Bridge of Wood that he built over the

*Bachiglione*, without *Vicenza*, in this Manner. He built alſo another Wooden Bridge ( tho' in a different Manner ) over the *Brenta*,* near *Baſſano* in *Italy*, a very rapid River that empties itſelf into the Sea near *Venice*: It is but 180 Feet a-croſs, and the Bridge is divided into 5 equal Parts of Arches 34 Feet and half, and the Breadth of it is 26 Feet.

The Piles, Beams, or Summers, *&c.* I have deſign'd according to the Scantlings of thoſe deſcrib'd by *Cæſar*; but the Width or Diſtance of the Piles are but 35 Feet diſtance, tho' his are 40, by Reaſon the Stream here not being ſo rapid, does not require it.

*Piles.*

The Piles being of Oak, and 18 Inches ſquare, are braced together by 2 Braces near to the Top; between which a Beam or Beams, of 2 Feet ſquare, going from one Side of the Bridge to the other, and preſſing contrary to each other, ſo great is the Strength of the Work, and ſuch the Nature of it, that by how much ſoever the Force of the Water is, and the Weight of the Top of the Bridge, by ſo much the faſter and ſtronger is all link'd together; neither are they ſo liable to be rais'd by the Ice, as Piles that ſtand perpendicular.

Where the Spaces are largeſt, the ſloping Piles are put 3 together, as the others are in

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* This River was call'd by the Antients *Meduacus*, to which ( as *Livy* relates in his firſt *Decad* ) *Cleonymus* the *Spartan* came with a Fleet before the *Trojan* War.

Couplets, for the greater Security and Strength, and have two Beams croſs them inſtead of one; which Beams are ſupported alſo by upright Oaken Piles, as in the Model, and are all of the ſame Dimenſions with the former.

Theſe Piles and Beams being the principal and chief Support of a Bridge, and ſo artfully put together, without any Iron for its Uſe, or Nails uſed in it, may not be unlike the Bridge we read of that was built by *Ancus Martius*, near *Ripa* (where ſome Remains are ſtill to be ſeen) and was afterwards built of Stone by *Emilius Lepidus*, when he was *Prætor*, aud repaired by the Emperors *Tiberius*, and *Antonius Pius*) of Timber, and the Pieces ſo artificially join'd together, that it might be taken up and carry'd whereſoever it ſhould be neceſſary; neither were there any Nails in it, or Iron for any Uſe. It is not known how it was contrived; only Writers ſay, that it was laid over great Pieces of Timber, which ſupported others; from whence it took its Name of *Sublician*, † becauſe in the *Voiſcian* Tongue, ſuch Pieces were called *Sublices*.

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† This was the Bridge that *Horatius Cocles* defended ſo beneficially for his Country, and ſo gloriouſly for himſelf: It is ſuppoſed to be ſituated on that Part of the River as we read of that *Hercules*, when having kill'd *Geryon*, he victoriouſly drove his Herd thro' *Italy*, built the firſt Bridge that ever was on the *Tyber*, in the Place where *Rome* was afterwards founded, and it was therefore call'd the *Holy Bridge*.

*Truſſes.* The Truſſes to ſupport the Beams and Joyſts over the Arches or Voids, I have made in two different Manners, as deſcrib'd in the Draught and Model, which are both ſolid and convenient; ſolid, becauſe all their Parts mutually ſupport each other, and convenient, becauſe they are no higher than the Rayles of the Sides of the Bridge ( which are fixed on the Back of the ſaid Truſſes). Thus making every Brace bear up its Pillar, and every Pillar the Croſs-Beams, and thoſe that make the Sides, being all well bolted and key'd together with Straps and Bolts of Iron, every Part bears its own Weight. Truſſes are to be made of various Sorts, according to the Deſign for which they are inteded, the Weight they are to ſupport, and the Length they are to bear or carry ſuch Weight, and particularly in Bridges: One of theſe ſort of Truſſes, which I have deſign'd, is made over a River call'd the *Ciſmone* in *Italy*, without any Piles or Timber in the Water, which anſwers the Intention, altho' of a great Length.

*Summers.* The Summers that ſupport the Floors over the Voids or Arches, muſt be hung up to theſe Truſſes, at the Ends that come beyond the Fronts of the Bridge, with Iron Straps and Pins faſtned to the ſaid Truſſes, by which Means the Summers become united to thoſe Side-Beams and Poſts, which are alſo ſupported by every Brace. Over the ſaid Beams are Joyſts of Oak laid, which muſt be cover'd with Oaken Planks, to carry the Gravel and Poſts on the Road.

*Heads.* The Heads of the Bridge ſhould be made very ſolid, with Stone or Brickwork, and Arches turned within the Walls, and then Gravel to be laid over the ſaid Heads, to the Level of the Ground up to the Ends of the Joyſts and Planks: The two Lodges for receiving the Toll, are to break backwards 15 Feet ſquare to the Weſt, and made of Brickwork, as in the Draught.

In ſuch Publick Works, and more particularly in Water-Works, ( notwithſtanding the beſt Eſtimates or Calculations ) no Certainty can be had of the Goodneſs of the Foundation, nor no foreſeeing the Accidents or Difficulties that may occur in the Building and Finiſhing ſuch a Work: It may not be the moſt convenient way that a private Perſon ſhould undertake the whole, for ſeveral Reaſons; for Inſtance only, the Caſe of *Daghenam Breach.*

I beg Leave, Sir, to treſpaſs a little longer on your Patience, and preſume to offer my Sentiments which Way may be the moſt Expedient, and Propereſt, for ſuch a Work to be finiſhed to the Satisfaction of the Commiſſioners, the Benefit of the Publick, and Subſtantialneſs of the Work.

1. When the *Honuroable Commiſſioners* have fix'd on the Deſign or Model of the intended

Wooden Bridge, and the particular Scantlings and Dimenſions ſettled and aſcertained, I humbly propoſe, that the *Committee* (by their Agents) ſhould provide all their own Materials, as Timber, Iron, Stone, Bricks, *&c.* in which Caſe they would not only be aſſured of being well ſupply'd without Delay or Loſs of Time, but would alſo be aſſured of having the *beſt Sort*; and that no Part of the Work might be ſlighted in the Scantlings or Lengths of Piles as ſhould be extraordinarily required in the Execution Part, more than what could be at preſent thought on or foreſeen, and which an Undertaker might ſpare or neglect, thro' ſaving the Charge, nay or even refuſe to do without a ſecond Contract, which might give handle to break the firſt, on every trivial Alteration therefrom, or Addition thereto, (eſpecially if they ſhould find it prove a hard Bargain.)

2. The *Committee* having provided a Quantity of Materials, the next thing would be, to fix on a Place where to work the ſame, as near as poſſible to the intended Bridge; and for the more Expedition the Work might be lett out in Lots or Proportions to different Carpenters and Workmen, according to the Quantity they could be able to undertake and perform in ſuch and ſuch Times allotted; every Perſon taking ſo many Arches and Piles; and the like with the reſt, for the Workmanſhip, according to the Rates pre-

viouſly and publickly agreed for, between the Parties and the Committee: By which means the Committee would always have it in their Power to have the Works go on as faſt as they pleaſed, and to add, alter, or diminiſh from the firſt Intention as they ſhould think fit, or change any Workman not performing his Agreement; which could not eaſily be done with a general Undertaker.

It would alſo be proper for the Committee to appoint a Perſon as Superintendant or Surveyor of the whole Work, to direct and manage the ſame, and report the Proceedings continually to them, who (together with an Aſſiſtant or Clerk, to meaſure the Works, and take Charge of the Materials, and Storehouſe, and ſee that no Waſte be made,) might effectually complete the ſame, and anſwer the deſired Effect, eſpecially ſo many Ingenious and Worthy Gentlemen being of the Committee, and well skill'd in Works, as would immediately detect any indirect Practices, Frauds, or Neglect.

3. Another thing I muſt take Notice of, is, that as there will be great Quantities of Iron neceſſary to the Carpenters Work, ſo I would propoſe that a Forge be made in the Yard or Place where the Carpenters frame the Work, and two Smiths conſtantly attending them, that thereby no Time might be loſt, but the Work expeditious, and exactly fitted to its Uſe; which would alſo ſave a great Expence.

Thus, Sir, the whole Deſign may be carried on, and completely finiſh'd in a Subſtantial and Workman-like Manner, in nine Months Time, and not exceed the Sum of Money I communicated to your Honour at the laſt Meeting of the Committee at *Putney*.

*I am,* SIR,

*Your moſt Humble,*

*And moſt Devoted Servant,*

JOHN PRICE.

*Aug.* 5, 1726.